

REMARKS

This amendment is responsive to the Office Action mailed May 19, 2005. In the Office Action, Claims 1-18 were rejected based on prior art and Claims 19-38 were withdrawn. To facilitate the case toward allowance, applicants have canceled Claims 19-38. This cancellation of claims is without prejudice to applicants' right to present such claims or other claims for examination in one or more divisional patent applications. New Claims 39 and 40 have been added.

Applicants thank the Examiner for the indication of allowable subject matter in Claim 11. Applicants have carefully reviewed the Office Action and the cited references, and request reconsideration of the application in view of the amendments above and the following remarks.

The specification has been amended in accordance with the Examiner's suggestions in paragraph 2 of the Office Action. Additionally, Claims 8 and 15 have been amended to address the informalities identified in paragraph 3 of the Office Action.

In response to the rejection of Claims 7, 11, 12, 14, and 17 under 35 U.S.C. 112, second paragraph, applicants have (1) amended Claims 7 and 14 to indicate input data values; (2) amended Claim 11 to remove the limitation without antecedent basis; and (3) amended Claim 17 to indicate that the step of modifying the at least one data value is performed using only adjacent data values in the plurality of input data values to modify the at least one data value.

Applicants request reconsideration and allowance of Claim 1. While applicants disagree that Calderbank anticipated all the elements of Claim 1, applicants have amended Claim 1 to more particularly direct its application wherein "the linear transform is a fixed finite-dimensional linear transform, and the linear transform is one of a plurality of color transforms." Since the amendment to Claim 1 includes features of Claim 6 and Claims 9 and 10, Claim 6 has been canceled as redundant. Claims 9 and 10 have been retained since Claim 9 further specifies the

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linear transform as being "one of a plurality of RGB-to-YCbCr color transforms" and Claim 10 further specifies the linear transform as being "a RGB-to-YIQ color transform." Applicants submit that these elements are not shown explicitly or inherently in the cited and applied art.

The Office Action relied upon patents to Feig and Baker to reject Claims 9 and 10. Feig was argued as disclosing all of the elements of Claims 9 and 10 (including Claims 1 and former intervening Claim 6) except the feature of linear transform as being a color transform (i.e., RGB-to-YCbCr for Claim 9 and RGB-to-YIQ for Claim 10). Baker was argued as supplying the deficiency in Feig, with the comment that the references are combinable "because they both have aspects that are from the same field of endeavor of color transformation."

Applicants submit that Feig and Baker are not properly applicable to amended Claim 1 as presented above, nor is it apparent that one skilled in the art faced with the problem solved by the present application would look to combine Baker with Feig to achieve the claimed subject matter.

As described in the specification, the present application is directed to a method for lossless encoding of image data involving the approximation of an invertible linear transformation by an integer-to-integer transformation. The invertible linear transformation may be applied to vectors of a fixed length or to vectors of unbounded length which are of bounded amplitude. An approximation to an invertible linear transformation is at times necessary when the input vectors are integers and the entries in a matrix including the transformation are real numbers. In particular, the present application describes and claims a method for accomplishing lossless encoding of image data by use of an approximation matrix that can map integer input data to integer output data that is the same as that mapped to by a transformation matrix storing a known linear transform.

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Feig only discloses digital image compression using a discrete cosine transform (DCT) which is known to be lossy. Furthermore, while Feig discloses factorization techniques for subdividing matrices into a combination of factor matrices, and also discloses rounding of terms such as the square root of 3 (col. 11, lines 19-21) and the square root of 2 (col. 11, lines 33-35), this disclosure does not result in an invertible output that can be considered an approximation of "the second plurality of output data values" (that is, the output values that can be generated by applying the linear transform to the plurality of input data values).

Additionally, Feig does not teach or suggest the linear transform as being "one of a plurality of color transforms" as claimed. The Office Action relies on Baker but Baker does not disclose color transforms being applied in an integer transformation domain as set forth and claimed in Claim 1.

For at least these reasons, applicants submit that Claim 1 is patentable. Applicants have further considered Calderbank as it was applied to unamended Claim 1 but finds that Calderbank does not anticipate or render obvious the subject matter of Claim 1 as now pending. The article by Daubechies also does not overcome the deficiencies of Feig and Baker as discussed above. Claim 1 should be allowed.

Claims 2-5 and 7-18 have been amended or corrected in circumstances as appropriate to overcome rejections under 35 U.S.C. 112 and should also be allowed, both for their dependence on allowable Claim 1 and for the additional subject matter recited therein.

Claims 39 and 40 have been added. New Claim 39 is directed to the subject matter of Claim 11 which was indicated in the Office Action as being allowable. Claim 39 is thus believed to be in patentable form.

Claim 40 is directed to a method for generating a first plurality of output data values by transforming a plurality of input data values using a computer as previously presented in

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unamended Claim 1. New Claim 40, however, recites that the method comprises at least one step that is equivalent to a successive combination of one or more steps of the following types:

rearranging at least one data value in a plurality of current input data values;

negating at least one data value in the plurality of current input data values; and

modifying at least one data value in the plurality of current input data values, each modified data value generated by applying a linear combination of unmodified values in the plurality of input data values to the at least one data value, the linear combination comprised of an integer generated in a reproducible manner, the integer being from one of a group consisting of a rounded integer and a converted integer.

Applicants submit that the prior art does not disclose a method as claimed in Claim 40, wherein the method comprises "*at least one step that is equivalent to a successive combination of one or more steps*" of the types indicated above. Accordingly, Claim 40 is believed to be patentable over the prior art.

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CONCLUSION

For at least the foregoing reasons, applicants submit that the pending claims are in condition for allowance. Action to that end at an early date is respectfully requested. Should the Examiner identify any issues needing resolution prior to allowance of the application, the Examiner is invited to contact the undersigned attorney at (206) 695-1712.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the U.S. Postal Service in a sealed envelope as first class mail with postage thereon fully prepaid and addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the below date.

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